Non-Guideline deposition study of clomazone on non-target areas following treatment with Centium 36 CS or Command 48 EC.

Report:	MRID 49709402. Staffa, C. 2013. Large outdoor wind tunnel studies to evaluate the short range transport and deposition of volatilised Clomazone (120 g a.s./ha) as Centium 36 CS and Command 48 EC formulations including the assessment of bleaching effects on a sensitive test plant (*Stellaria media*) as a function of distance from the treated area (0-20 m). Unpublished study performed by RLP AgroScience GmbH, Neustadt, Germany; sponsored and submitted by FMC Chemical sprl, Brussels, Belgium. Study No.: AS253. Experiment initiation September 4, 2012 and completion November 14, 2012 (p. 11). Final report issued March 26, 2013.
Document No.:	MRID 49709402
Guideline:	Non-Guideline
Statements:	The study was conducted in accordance with the OECD Principles of Good Laboratory Practice and the German GLP regulations. Signed and dated Data Confidentiality, GLP, and Quality Assurance statements were provided (pp. 2-3, 5). A statement of authenticity was provided with the Quality Assurance statement.
Classification:	The submission is a non-guideline study. It can be classified as supplemental. No deviations from good scientific practices were noted.
PC Code:	125401
Reviewer:	James Lin Environmental Engineer
	Signature: **Date:** May 10, 2016

Executive Summary

The deposition of clomazone on non-target areas was studied following application of either Centium 36 CS (capsulated suspension) or Command 48 EC (emulsifiable concentrate formulation) to separate 25 x 4 m plots located within two wind tunnels. Clomazone was applied to bare soil at a target application rate of 120 g a.i./ha, following application of lindane at 400 g/ha, which was used as a reference substance. A constant wind was produced via fans at a velocity of 2 m/s, following the application of the test substance. Clomazone was collected from trays filled with water and placed 1, 3, 5, 10, 15, and 20 m downwind of the treated test plot, at 12, 24, 48, 72, and 96 hours following application of the test substance. Additionally, to monitor bleaching effects, a sensitive indicator plant (*Stella media* or common chickweed) was placed in different downwind areas and sampled at 1, 2, 3, and 4 days posttreatment, after which time plants were moved to a greenhouse for further cultivation and assessment at 7, 14, and 21 days after application. The method for clomazone and lindane were validated at the LOQ (0.10 µg/L) and 50 µg/L.

Following 96 hours posttreatment, deposition of clomazone was reduced for the Centium 36 CS formulation at all sampling stations, as compared to the Command 48 EC formulation. After 96 hours posttreatment, the concentration of clomazone on the sampling trays located at 1 m from the test plot accounted for 0.07% of the target applied for the Centium 36 CS formulation, compared to 1.09% for the Command 48 EC formulation and 0.95-0.97% for the lindane reference standard. At 5 m from the test plot, clomazone accounted for 0.03% of the target applied for the Centium 36 CS formulation, compared to 0.33% for the Command 48 EC formulation and 0.25-0.46% for lindane. Clomazone was not detected in deposition trays located more than 5 m from the area treated with Centium 36 CS; however, at 96 hours posttreatment clomazone was detected at a distance of 20 m at 0.07% following treatment with Command 48 EC, and lindane was detected at 0.04-0.11% at a distance of 20 m at 96 hours posttreatment (both treatments). The maximum deposition results are presented in **Table 1**.

Table 1. Maximum deposition of clomazone and lindane

Analyte	Deposition (% of applied)					
	1 m	**3 m**	**5 m**	**10 m**	**15 m**	**20 m**
	Centium 36 CS formulation					
Clomazone	0.07 (96 hr)	0.04 (96 hr)	0.03 (96 hr)	<LOQ	<LOQ	<LOQ
Lindane	0.95 (24 hr)	0.60 (48 hr)	0.47 (48 hr)	0.26 (24/48 hr)	0.15 (24 hr)	0.12 (48 hr)
	Command 48 EC formulation					
Clomazone	1.09 (96 hr)	0.55 (96 hr)	0.33 (96 hr)	0.15 (96 hr)	0.08 (96 hr)	0.07 (96 hr)
Lindane	0.97 (48 hr)	0.43 (48 hr)	0.25 (48 hr)	0.11 (48 hr)	0.05 (48/72 hr)	0.04 (48/72 hr)

Clomazone reached maximum concentrations at the end of the study period, 96 hours, for both trials; however, lindane reached maximum concentrations in all sampling trays at 24-48 hours following treatment for both study trials, with concentrations in the trays clearly declining by 96 hours posttreatment. Focusing on the closest measurements at 1 meter, the deposition results with time are depicted in **Table 2**. The two reference treatments with Lindane showed some inconsistence, the lowest deposition of 0.56% following Command 48 EC treatment was observed at 12 hours, whereas the lowest deposition of 0.51% following Centrium 36 CS treatment was observed at 96 hours. Both Clomazone treatments show deposition increased with time, since the experiments ended at 96 hours after the treatment, it is possible that the deposition may be increasing further without the determination of mass balance. Especially for the encapsulated Centium 36 CS treatment, the deposition impact may be delayed due to the slower release.

Table 2. Deposition Results at 1 Meter Measurement

Treatment	12 hr	24 hr	48 hr	72 hr	96 hr
	% Applied	**% Applied**	**% Applied**	**% Applied**	**% Applied**
Lindane following 48 EC	**0.56**	0.82	0.97	0.93	0.6
Lindane following 36 CS	0.9	0.95	0.86	0.69	**0.51**
Command 48 EC	0.35	0.59	0.9	1.06	**1.09**
Centium 36 CS	<0.03	<0.03	0.04	0.05	**0.07**

For Centium 36 CS, no bleaching effects were observed on the indicator plants placed at 1, 5, 10, and 20 m downwind of the treated area. At study termination, plant fresh weight per pot was 86.1% of the control weight at a distance of 1 m and was 98.9-102% of the control weight for indicator plants placed at 5-20 m from the treated plot.

For Command 48 EC, bleaching effects were initially observed on indicator plants at 7 days posttreatment, on plants placed at 1 and 5 m from the treated area, and bleaching effects were observed at all downwind sampling stations at 14 and 21 days posttreatment (plants were removed from the wind tunnel after 4 days and cultivated in a greenhouse). By 21 days posttreatment, the 1 m indicator plants showed bleaching effects of *ca*. 57% of the leaf surface, with plants farther downwind exhibiting less bleaching effects, *ca*. 5% for plants located 20 m downwind. The extent of bleaching effects as a function of downwind distance from the treated area was not reflected by the fresh mass determination. At study termination, plant fresh weight per pot was 86.9-92.8% of the control weight at all distances, 1-20 m from the treated plot.

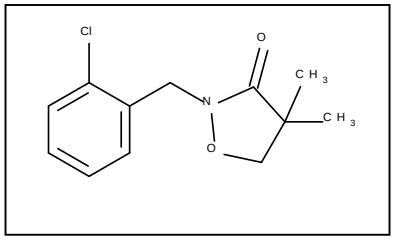
I. Materials and Methods

A. Materials:

1. Test Material: Product Name: Centium 36 CS (358.0 g a.i./L; Batch No.: M-1109-002; p. 19; Appendix 2, p. 52)
Formulation type: Capsulated suspension

Product Name: Command 48 EC (475.6 ± 2.5 g/L; Batch No.: 11401.003; p. 20; Appendix 3, p. 53)
Formulation type: Emulsifiable concentrate

CAS #: 81777-89-1 (Appendix 5, p. 55; Appendix 22, p. 90)
Storage stability: Not reported



2. Storage Conditions: Room temperature (pp. 19-20).

B. Study Design:

The deposition of clomazone on non-target areas was studied following application of either Centium 36 CS (capsulated suspension) or Command 48 EC (emulsifiable concentrate formulation) to 25 x 4 m plots located within a wind tunnel. Clomazone was applied to bare soil at a target application rate of 120 g a.i./ha, following application of Lindane at 400 g/ha, which was used as a reference substance. The tests were conducted for a period of 96 hours at a constant wind speed of 2 m/s (following test substance application).

C. Test Sites:

The experiments were conducted within a wind tunnel of *ca*. 55 m length, 6.5 m width, and height of 3.1 m (p. 24). A wind engine with 26 synchronously working fans located at one end of the tunnel and the other end was left open. The treated plot measured 25 x 4 m (100 m^2) and was established 5 m downwind of the fans; the distance from the side edges of the field to the wind tunnel was 1.25 m on each side. The non-target area was grown with local green fallow, which was cut to a few centimetres prior to the experiment using a lawn mower.

The test site soil was not characterized according to the USDA soil classification system. Soil was reported as 45.7% sand (2000-63 µm), 37.9% silt (63-2 µm), and 16.4% clay (<2 µm; p. 25); total organic carbon was 1.0% and pH was 7.21.

Wind speed, wind direction, relative air humidity and air temperature were monitored at 7.5 m behind the target area and 2.0 m above the ground (p. 25). Mean wind speed was 2.01-2.03 m/s for both trials (Tables 7-8, pp. 34-35; Appendix 9, Figure 11, p. 62; Appendix 10, Figure 17, p. 68). Climatic conditions during the trials are reported in **Table 3** below.

Table 3. Climatic conditions

	Wind speed (m/s)	Air temp. (°C)	Air humidity (% RH)	Wind direction (deg)	Soil moisture (% WHC_{max})	Soil temp. (°C)
Centium 36 CS Trial						
Mean	2.01	18.7	57.7	169.8	50.1	19.4
Std. Dev.	0.06	6.3	18.0	0.4	3.5	2.6
Minimum	1.69	8.0	25.6	168.5	43.9	14.9
Maximum	2.08	31.7	87.6	170.8	55.9	25.0
Command 48 EC Trial						
Mean	2.03	15.8	73.3	169.2	52.7	19.4
Std. Dev.	0.07	5.1	18.0	0.4	1.4	0.6
Minimum	1.81	7.5	40.8	168.1	49.9	18.0
Maximum	2.13	27.1	96.7	170.2	55.0	20.4

Data obtained from Tables 7-8, pp. 34-35; Appendix 9, Table 21, pp. 59-61; and Appendix 10, Table 22, pp. 65-67 in the study report.

D. Experimental Design:

Prior to the test substance application, a seed bed was prepared in the application area and the target area was irrigated until *ca*. 55% of the maximum water holding capacity was reached in the top 0-5 cm (p. 25). After the soil surface was allowed to dry, clomazone, as Centium 36 CS

or Command 48 EC, was applied to a bare soil plot (25 x 4 m, located within the wind tunnel) at a target application rate of 120 g a.s./ha (*ca*. 300 L/ha; pp. 27-28). Test applications were made using eight 90% drift reducing nozzles (six Lechler ID 120-05 nozzles and two IS 80-05 edge nozzles). Different wind tunnels were used for each test formulation. The test substance application was made immediately following application of Lindane 800 SC at a target rate of 400 g/ha, which was used as a reference substance (pp. 21, 26, 31-32). The wind engine maintained a wind speed of 2 m/s following the test substance application until the end of the study period.

E. Sample Collection/Handling/Processing:

Stainless steel trays filled with 25 mL of tap water were set up at 1, 3, 5, 10, 15, and 20 m downwind from the treated area (p. 24); trays were placed at the designated sampling locations five minutes after application of the test item. An additional tray was established 2.5 m behind the treated plot as a background control. At 12, 24, 48, 72, and 96 hours following application of the test substance, the water in the trays was stirred and two 0.5-L samples were collected from each tray and transferred to 1 L-Nalgene bottles (p. 29). Samples were placed in frozen storage directly after sampling (p. 30). Samples were analyzed within *ca*. 6 weeks.

Figure 1. Test system and sampling points.

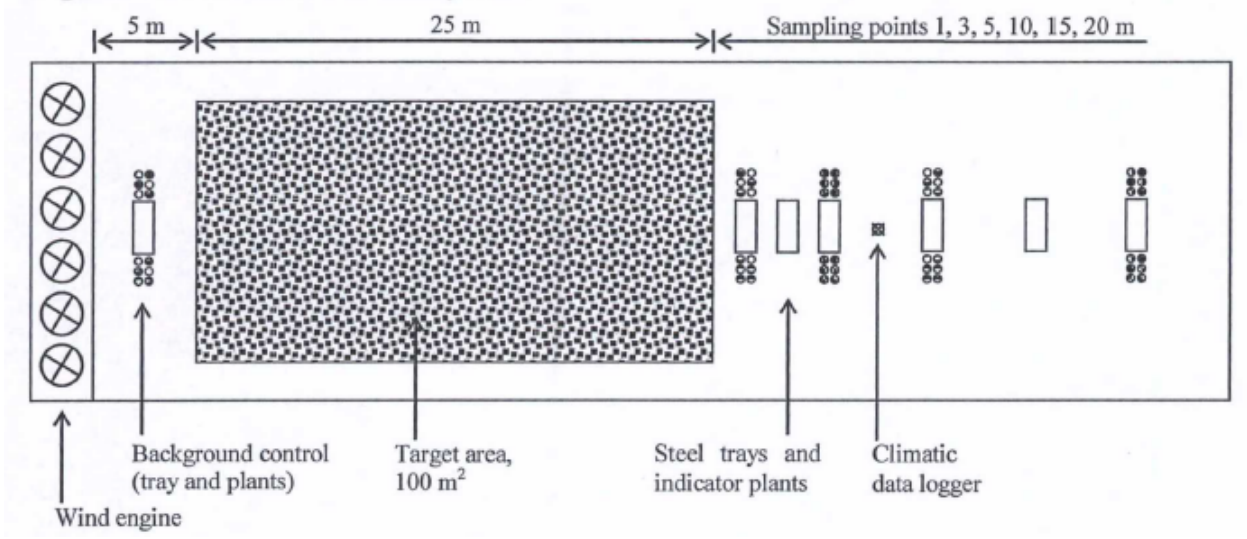


Figure obtained from Figure 1, p. 24 in the study report.

Additionally, to monitor bleaching effects, a sensitive indicator plant (*Stella media* or common chickweed) was placed at 2.5 m upwind from the treated plot (control) and at 1, 5, 10, and 20 m downwind from the treated plot (pp. 24, 26). At each location, *ca*. 12 pots containing *ca*. 40 plants each were established (*ca*. 10 cm length per plant; BBCH growth stage 15). The indicator plants were carried into the wind tunnel and placed at the designated sampling locations *ca*. 30 seconds after starting the wind engine (p. 28). Plants were sampled at 1, 2, 3, and 4 days posttreatment, after which time plants were moved to a greenhouse for further cultivation (mean temperature of 18.1-19.5°C; mean relative humidity of 60.2-62.3%) and assessment at 7, 13-14, and 21 days after application (p. 29; Tables 9-10, p. 35). The plants were cultivated according to good horticultural practice. At each sampling interval, observations were made and recorded regarding bleaching. Bleaching was assessed as a percentage affected plant leaf surface as compared to the control. Following the 21-day assessment, the plants were cut directly above the ground and the plant fresh weight was determined.

F. Analytical Methods:

Aqueous samples (50 mL) were partitioned three times with 15 mL of dichloromethane for one minute and filtered through anhydrous sodium sulfate (p. 30; Appendix 22, p. 92). Toluene (1.5 mL) was added as a keeper and the samples were concentrated to <1.5 mL (not dryness) using a rotary evaporator, prior to adjusting to 2 mL with toluene. Extracts were analyzed for clomazone and lindane using a Thermo TSQ Quantum GC/MS system (Agilent VF-5MS column, 30 m length, 0.32 mm i.d., 0.25 µm film thickness) with electron impact mass spectrometric detection. For clomazone, the parent-daughter ion transition *m/z* 125 → 89 was used for quantitation and *m/z* 127 → 89 was used for confirmation. For lindane, the parent-daughter ion transition *m/z* 181 → 146 was used for quantitation and *m/z* 183 → 148 was used for confirmation. The retention times were observed at *ca*. 7.2 and 7.3 min. for clomazone and lindane, respectively.

The LOQ was 0.10 µg/L for clomazone and lindane, and the LOD was set at 20% of the LOQ (0.02 µg/L) for both analytes (Appendix 11, p. 71). For clomazone, detection at the LOQ

corresponded to 0.03% of applied clomazone, based on the target application rate.

G. Verification of the Extraction Method and Storage Stability:

1. Spike Recoveries:

The method for clomazone and lindane were validated at the LOQ (0.10 µg/L) and 50 µg/L (Appendix 22, pp. 88, 92). Mean recovery of clomazone for both the quantitation and confirmation ion transitions were 86-88% following fortification at the LOQ and 103-104% following fortification at 50 µg/L (Appendix 22, p. 94). Mean recovery of lindane for both the quantitation and confirmation ion transitions were 82-86% following fortification at the LOQ, and 95-96% following fortification at 50 µg/L.

2. Storage Stability Study:

For each application, a reference solution was prepared with clomazone analytical standard in water at 1 µg/L, and 100 mL of the solution was incubated in a quartz glass vessel for up to 96 hours to determine whether hydrolysis or photolysis of the test item was occurring (p. 27).

For Centium 36 CS, stability of clomazone in reference solution was 83-86% of the target concentration following 0 and 96 hours, and for Command 48 EC, stability of clomazone in reference solution was 94% of target at 0 hours and 80% following 96 hours (Tables 19-20, p. 47). Recoveries of lindane were low for both trials, ranging from 16 to 18% of the target. The study author suggested that the low concentration of lindane was caused by a weighing error during preparation of the reference solution, and stated that lindane is known to be stable under wind tunnel and storage conditions (p. 47).

II. Results and Discussion

A. Findings:

Centium 36 CS. Deposition of volatilized clomazone was greatest at the closest sampling station, and was not detected in the trays beyond 5 m from the treated area (Table 11, p. 36). Concentrations of clomazone in the trays were still increasing at the end of the 96-hour study period. Deposition of clomazone was initially detected above the LOQ at 48 hours posttreatment at 1 m downwind, at a concentration equivalent to 0.04% of the clomazone applied to the target area, and increased to 0.07% of the applied at 1 m, following 96 hours. At 3 m downwind from the treated area, clomazone was initially detected in the deposition trays at 0.03% of the clomazone applied to the target area and was 0.04% at 96 hours. Clomazone was not detected above the LOQ beyond 3 m, with the exception of a detection at the LOQ (0.03% of the applied) at 5 m following 96 hours. Clomazone was not detected above the LOD in background controls. Concentrations of clomazone in sampling trays are shown in **Table 4**.

Table 4. Deposition of clomazone following treatment of target area with Centium 36 CS.

Sampling distance (m)	12 hr		24 hr		48 hr		72 hr		96 hr	
	µg/m²	% Applied	µg/m²	% Applied	µg/m²	% Applied	µg/m²	% Applied	µg/m²	% Applied
1	<LOQ	<0.03	<LOQ	<0.03	4.75	0.04	6.57	0.05	8.33	0.07
3	<LOD	<0.006	<LOQ	<0.03	<LOQ	<0.03	3.82	0.03	4.26	0.04
5	<LOD	<0.006	<LOQ	<0.03	<LOQ	<0.03	<LOQ	<0.03	3.15	0.03
10	<LOD	<0.006	<LOD	<0.006	<LOQ	<0.03	<LOQ	<0.03	<LOQ	<0.03
15	<LOD	<0.006	<LOD	<0.006	<LOQ	<0.03	<LOQ	<0.03	<LOQ	<0.03
20	<LOD	<0.006	<LOD	<0.006	<LOQ	<0.03	<LOQ	<0.03	<LOQ	<0.03
Control	<LOD	<0.006	<LOD	<0.006	<LOD	<0.006	<LOD	<0.006	<LOD	<0.006

Data obtained from Table 11, p. 36 in the study report. Reported data are means of duplicate replicates (Appendix 14, p. 74).

No bleaching effects were observed on the indicator plants placed at 1, 5, 10, and 20 m downwind of the treated area (p. 42; Table 15, p. 43). At study termination, plant fresh weight per pot was 86.1% of the control weight at a distance of 1 m and was 98.9-102% of the control weight for indicator plants placed at 5-20 m from the treated plot (p. 44; Table 17, p. 45; Figure 7, p. 45).

Figure 2. Plant fresh weight relative to background control (Centium 36 CS treatment).

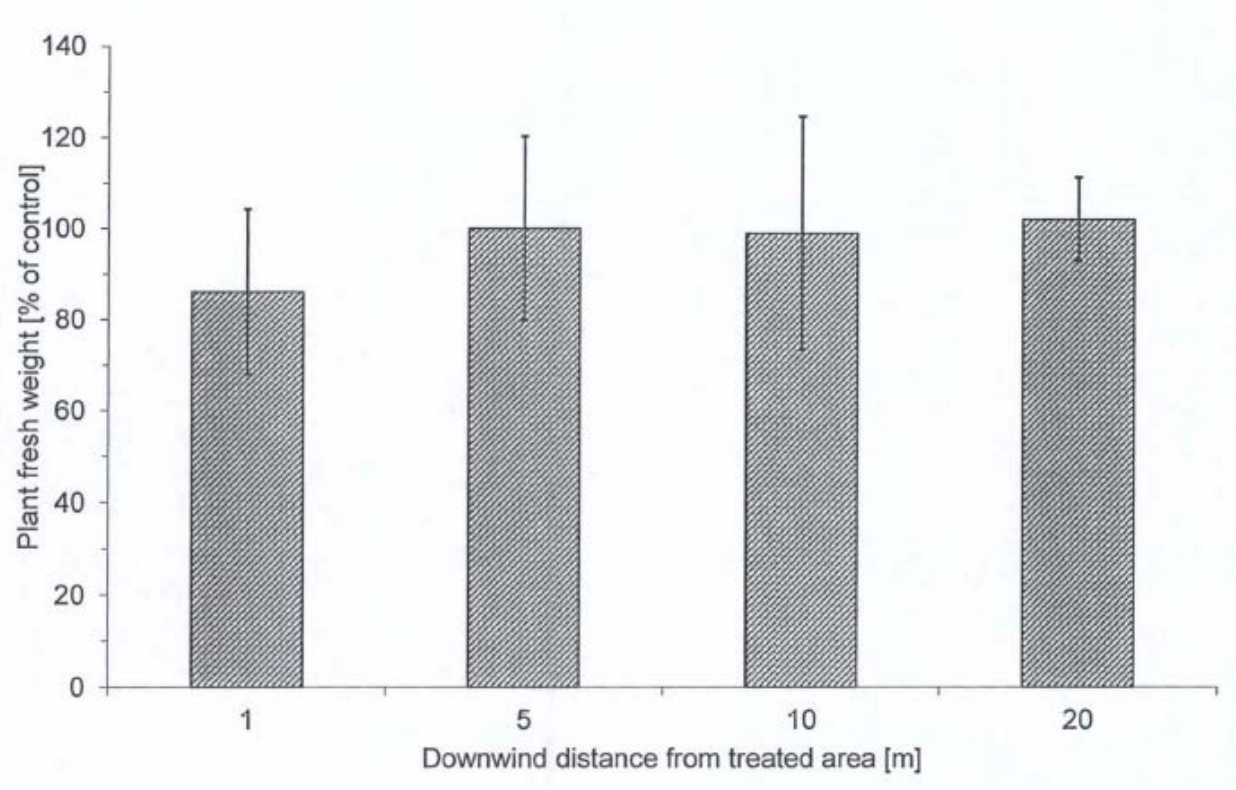


Figure obtained from Figure 7, p. 45 in the study report.

Command 48 EC. Deposition of volatilized clomazone reached all sampling stations (20 m); however, was greatest at the closest sampling station (Table 12, p. 38). Concentrations of clomazone in the trays were still increasing at the end of the 96-hour study period. Deposition of clomazone was initially detected above the LOQ at 12 hours posttreatment at 1-10 m downwind, at a maximum concentration equivalent to 0.35% of the clomazone applied to the target area, at 1 m. Following 96 hours, clomazone was detected in sampling trays at 1.09% of the applied at 1 m, 0.55% at 3 m, 0.33% at 5 m, 0.15% at 10 m, 0.08% at 15 m, and 0.07% at 20 m. Clomazone was not detected above the LOD in background controls. Concentrations of clomazone in sampling trays are shown in **Table 5**.

Table 5. Deposition of clomazone following treatment of target area with Command 48 EC.

Sampling distance (m)	12 hr		24 hr		48 hr		72 hr		96 hr	
	µg/m²	% Applied	µg/m²	% Applied	µg/m²	% Applied	µg/m²	% Applied	µg/m²	% Applied
1	42.1	0.35	70.7	0.59	108.0	0.90	127.2	1.06	130.4	1.09
3	22.3	0.19	34.9	0.29	48.3	0.40	58.1	0.49	65.9	0.55
5	13.1	0.11	18.8	0.16	26.0	0.22	36.2	0.30	39.7	0.33
10	5.3	0.04	7.1	0.06	11.4	0.10	14.5	0.12	17.5	0.15
15	<LOQ	<0.03	<LOQ	<0.03	5.9	0.05	7.7	0.06	9.8	0.08
20	<LOQ	<0.03	<LOQ	<0.03	4.7	0.04	6.7	0.06	7.8	0.07
Control	<LOD	<0.006	<LOD	<0.006	<LOD	<0.006	<LOD	<0.006	<LOD	<0.006

Data obtained from Table 12, p. 38 in the study report. Reported data are means of duplicate replicates (Appendix 15, p. 75).

Bleaching effects were initially observed on indicator plants at 7 days posttreatment, on plants placed at 1 and 5 m from the treated area, and bleaching effects were observed at all downwind sampling stations at 14 and 21 days posttreatment (plants were removed from the wind tunnel after 4 days and cultivated in a greenhouse; p. 43; Table 16, p. 44). By 21 days posttreatment, the 1 m indicator plants showed bleaching effects of *ca*. 57% of the leaf surface, with plants farther downwind exhibiting less bleaching effects, *ca*. 5% for plants located 20 m downwind. Bleaching effects are shown in **Table 6**.

Table 6. Results of bleaching effect assessment (Command 48 EC treatment).

Sampling distance (m)	Mean percent bleached (± SD)						
	1	2	3	4	7	14	21
1	0	0	0	0	33 (± 12)	49 (± 11)	57 (± 11)
5	0	0	0	0	16 (±15)	25 (± 22)	31 (± 28)
10	0	0	0	0	0 (±1)	19 (± 20)	19 (± 20)
20	0	0	0	0	0	9 (± 12)	5 (± 8)
Control	0	0	0	0	0	0	0

Data obtained from Table 16, p. 44; and Appendix 18, p. 78 in the study report.

At study termination, plant fresh weight per pot was 86.9-92.8% of the control weight at all distances, 1-20 m from the treated plot (p. 45; Table 18, p. 46; Figure 7, p. 45).

Figure 3. Plant fresh weight relative to background control (Command 48 EC treatment).

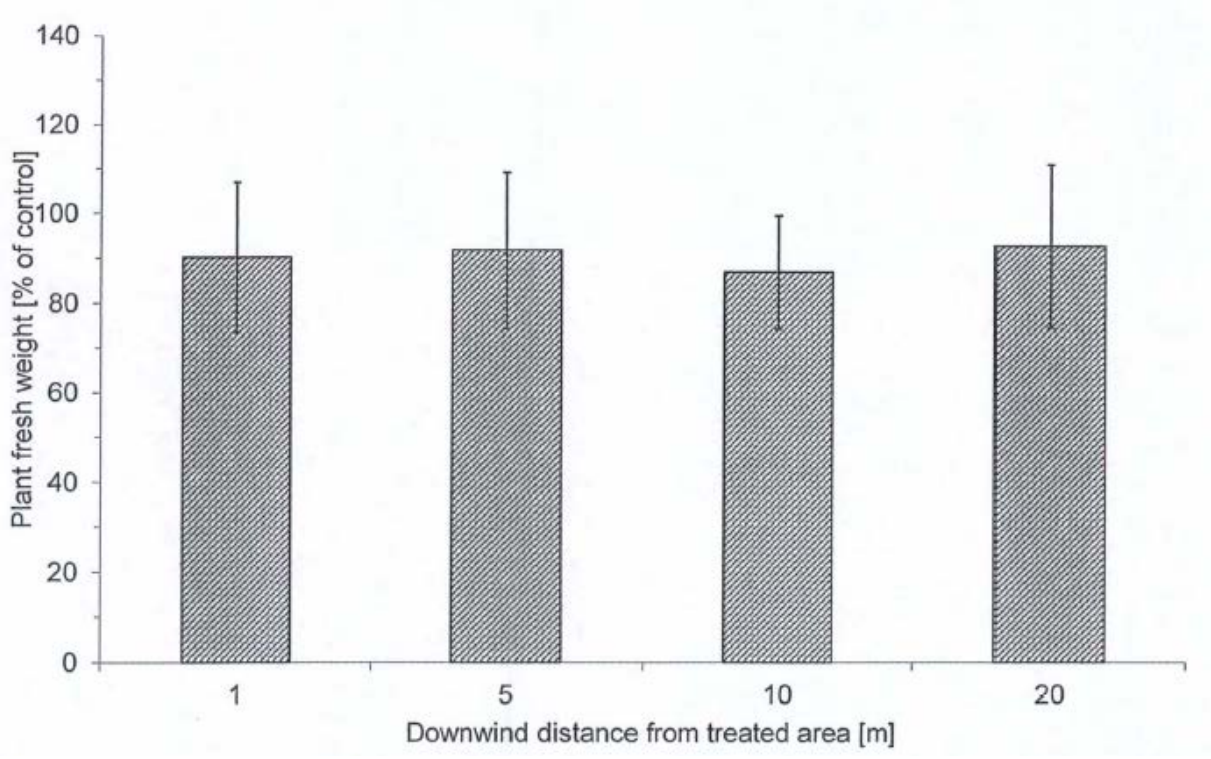


Figure obtained from Figure 8, p. 46 in the study report.

Reference Item (Lindane). Deposition of the reference item Lindane was also highest at 1 m from the treated plot; however, reached maximum concentrations in all sampling trays at 24-48 hours following treatment for both study trials, with concentrations in the trays clearly declining by 96 hours posttreatment (Tables 13-14, pp. 39, 41). Lindane was not detected above the LOQ in background controls. Concentrations of Lindane in sampling trays are shown in **Tables 7** and **8**.

Table 7. Deposition of reference item Lindane following treatment of target area (Centium 36 CS treatment).

Sampling distance (m)	12 hr		24 hr		48 hr		72 hr		96 hr	
	µg/m^2	% Applied	µg/m^2	% Applied	µg/m^2	% Applied	µg/m^2	% Applied	µg/m^2	% Applied
1	362.5	0.90	382.7	0.95	345.7	0.86	280.0	0.69	204.8	0.51
3	192.2	0.48	231.3	0.57	243.6	0.60	172.9	0.43	110.2	0.27
5	147.6	0.37	186.9	0.46	189.4	0.47	124.1	0.31	88.8	0.22
10	84.7	0.21	103.6	0.26	103.6	0.26	66.8	0.17	47.5	0.12
15	55.3	0.14	61.5	0.15	46.2	0.11	48.3	0.12	31.0	0.08
20	43.8	0.11	46.3	0.11	50.0	0.12	33.8	0.08	22.7	0.06
Control	<LOQ	<0.01	<LOQ	<0.01	<LOQ	<0.01	<LOQ	<0.01	<LOQ	<0.01

Data obtained from Table 13, p. 39 in the study report.

Table 8. Deposition of reference item Lindane following treatment of target area (Command 48 EC treatment).

Sampling distance (m)	12 hr		24 hr		48 hr		72 hr		96 hr	
	µg/m^2	% Applied	µg/m^2	% Applied	µg/m^2	% Applied	µg/m^2	% Applied	µg/m^2	% Applied
1	224.6	0.56	329.9	0.82	391.8	0.97	372.9	0.93	240.1	0.60
3	117.1	0.29	159.0	0.39	173.3	0.43	150.2	0.37	125.3	0.31
5	72.1	0.18	88.1	0.22	99.4	0.25	97.8	0.24	74.7	0.19
10	26.1	0.06	32.1	0.08	43.4	0.11	41.4	0.10	30.4	0.08
15	13.5	0.03	16.9	0.04	21.1	0.05	21.1	0.05	17.7	0.04
20	11.6	0.03	12.0	0.03	16.4	0.04	17.7	0.04	13.6	0.03
Control	<LOQ	<0.01	<LOQ	<0.01	<LOQ	<0.01	<LOQ	<0.01	<LOQ	<0.01

Data obtained from Table 14, p. 41 in the study report.

III. Study Deficiencies and Reviewer's Comments

1. The maximum label rate for clomazone was not reported in the study report.

2. The tests were conducted at a constant wind speed of 2 m/s (*ca*. 4.5 mph), which the study author stated provided a "realistic worst case" scenario for the study trial (p. 24).

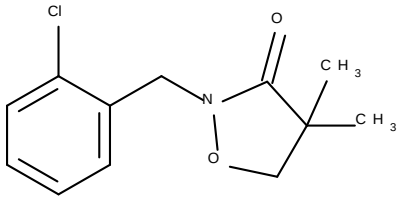
3. Soil was not characterized according to the USDA soil classification system.

4. The mean volume of water in the sampling trays declined from *ca*. 23,790-24,161 mL at 12 hours to 11,340-14,285 mL at 96 hours due to evaporation and previous water sampling (p. 33; Tables 5-6, pp. 33-34).

IV. References

None

DER ATTACHMENT 1. Clomazone and Its Environmental Transformation Products. [A]

Code Name/ Synonym	Chemical Name	Chemical Structure	Study Type	MRID	Maximum %AR (day)	Final %AR (study length)
PARENT						
Clomazone	**IUPAC:** 2-(2-Chlorobenzyl)-4,4-dimethyl-1,2-oxazolidin-3-one **CAS:** 2-[(2-Chlorophenyl)methyl]-4,4-dimethyl-3-isoxazolidinone **CAS No.:** 81777-89-1 **Formula:** $C_{12}H_{14}ClNO_2$ **MW:** 239.7 g/mol **SMILES:** O1CC(C)(C)C(=O)N1Cc2ccccc2Cl		835.8100 Field volatility	49709402	PRT	PRT
MAJOR (>10%) TRANSFORMATION PRODUCTS						
No major transformation products were identified.						
MINOR (<10%) TRANSFORMATION PRODUCTS						
No minor transformation products were identified.						
REFERENCE COMPOUNDS NOT IDENTIFIED						
All compounds used as reference compounds were identified.						

[A] AR means “applied radioactivity”. MW means “molecular weight”. PRT means “Parent”.